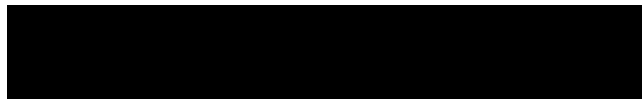# EXHIBIT B

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

| | |
|---|---|
| TQ DELTA, LLC,<br><br>     *Plaintiff,*<br><br>v.<br><br>COMMSCOPE HOLDING COMPANY, INC., COMMSCOPE, INC., ARRIS US HOLDINGS, INC., ARRIS SOLUTIONS, INC., ARRIS TECHNOLOGY, INC., and ARRIS ENTERPRISES, LLC,<br><br>     *Defendants.* | Civil Action No.: 2:21-cv-00310-JRG<br><br>███████████ |

**COMMSCOPE'S SIXTH SUPPLEMENTAL OBJECTIONS AND RESPONSES TO PLAINTIFF'S FIRST SET OF INTERROGATORIES (NOS. 1–18)**

Pursuant to Federal Rules of Civil Procedure 26 and 33, Defendants CommScope

Holding Company, Inc., CommScope, Inc., ARRIS US Holdings, Inc., ARRIS Solutions, Inc.,

ARRIS Technology, Inc., and ARRIS Enterprises, LLC (collectively, "CommScope" or

"Defendants") hereby state their Objections and Responses to Plaintiff TQ Delta's First Set of

Interrogatories to the CommScope Defendants (Nos. 1–18) ("Interrogatories").

**PRELIMINARY STATEMENT**

These objections and responses are made based on CommScope's present knowledge,

information, and belief, and based on CommScope's understanding of the case as set forth in

Plaintiff's Complaint.  This case is still at its early stages, and discovery has recently

commenced.  Thus, CommScope reserves the right to amend or supplement these Responses in

accordance with CommScope's obligations under the Federal Rules of Civil Procedure.

CommScope does not waive or intend to waive any objections that it may have regarding the use

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Pursuant to Federal Rule of Civil Procedure 26(e)(1), CommScope reserves the right to
revise or supplement this response as necessary.

**INTERROGATORY NO. 5:**

For each patent claim asserted in TQ Delta's Infringement Contentions (and any
amendment, and supplement thereto), state whether such claim is essential to the implementation

of one or more of the DSL Standards, identify the DSL Standards for which such patent claim is

essential, and identify and explain all reasons why such claim is, or is not, essential.

**RESPONSE TO INTERROGATORY NO. 5:**

CommScope restates each of the General Objections as set forth fully herein.

CommScope objects to this Interrogatory on the grounds that it is compound and improperly

includes multiple subparts.  CommScope objects to this Interrogatory on the grounds that it is

premature and unduly burdensome to request this information from CommScope because (a) TQ

Delta has yet to disclose which patent claims it contends are essential to comply with the DSL

Standards and (b) TQ Delta has yet to provide claim charts that map the asserted patent claims to

the any of the accused CommScope products.  CommScope objects to this Interrogatory on the

grounds that the terms "essential to the implementation" is vague and ambiguous.  CommScope

objects to this Interrogatory on the ground it is not reasonably calculated to lead to admissible

evidence because of TQ Delta's (or its predecessor's) agreement to license its patents on fair,

reasonable and non-discriminatory terms.  CommScope objects on the grounds that this

Interrogatory calls for an expert opinion and/or legal conclusion, which is premature given the

early stage of the case and the Court's December 17, 2021 Docket Control Order (Dkt. 62).

Subject to, and without waiving, its Specific and General Objections, and based on

CommScope's current understanding of the information sought by this Interrogatory and

CommScope's current understanding of the facts of this case, CommScope responds as follows:

CommScope's investigation in this matter is ongoing.  Additionally, CommScope's contentions

regarding standard essentiality will be based on determinations by CommScope's expert(s) and

will be provided to TQ Delta in accordance with the expert discovery schedule.

Pursuant to Federal Rule of Civil Procedure 26(e)(1), CommScope reserves the right to

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revise or supplement this response as necessary.

**SUPPLEMENTAL RESPONSE TO INTERROGATORY NO. 5:**

CommScope restates each of the General Objections and specific objections as if set forth fully herein.  CommScope has not completed its investigation in this case and has not completed discovery.  CommScope bases this response on Plaintiff's Disclosure of Asserted Claims and Infringement Contentions, dated November 4, 2021, including as later corrected by TQ Delta, *see* Dkt. Nos. 98, 105, and the combinations of patent claims and standards charted therein.  This response is based only upon such information in CommScope's possession, custody or control, and CommScope's current understanding of TQ Delta's infringement contentions and interpretation of the relevant standards.  Should TQ Delta further modify its infringement contentions, CommScope reserves the right to supplement or modify this response accordingly. Further discovery (including expert discovery) and investigation may reveal additional information that may lead to additions or to variations on the contentions set forth herein, and CommScope reserves the right to modify or supplement this response accordingly.

CommScope provides this response only as to those portions of the standards on which TQ Delta relies for each of its infringement contentions for the asserted claims. This response is not intended to be specific to any implementation of any of the relevant standards including, but not to, any CommScope product.

CommScope interprets the term "essential to the implementation" consistent with the manner in which it is used by the International Telecommunications Union Telecommunications Standardization Sector ("ITU-T"), that "[e]ssential patents are patents that would be required to implement a specific Recommendation/Deliverable." *See* Patent and Licensing Statement and Licensing Declaration for ITU-T or ITU-R Recommendation/ISO or IEC Deliverable.

Should one or more of the asserted claims be found to be essential to the implementation of one or more of the standards and recommendations identified by TQ Delta, CommScope reserves, and explicitly does not waive, the right to demand that TQ Delta comply with its obligation to license such a claim under fair, reasonable, and non-discriminatory terms.

Subject to, and without waiving, its Specific and General Objections, and based on CommScope's current understanding of the information sought by this Interrogatory and CommScope's current understanding of the facts of this case, CommScope responds as follows: In its Infringement Contentions, TQ Delta has alleged that the CommScope Accused Products infringe various claims of TQ Delta's patents solely because the Accused Products implement certain DSL standards.  To the extent a factfinder agrees with TQ Delta's assertion that any claim, as construed by the Court, is valid and is infringed due to the Accused Products' compliance with certain DSL standards, such claim would, by definition, be standard-essential. As there has been no final judgment entered that any asserted claims are valid and infringed by way of the Accused Products' compliance with DSL standards, CommScope provides the contentions below as to why the asserted claims are not standard-essential.  CommScope reserves the right to amend and/or supplement this response after any court rulings or jury verdicts relating to infringement and invalidity of the asserted claims.  For example, if the judgment of infringement and no invalidity in Delaware for Family 2 ('881 patent) becomes final, CommScope acknowledges that the asserted claims of the '881 patent would be considered standard-essential.

**Family 1:**

**U.S. Patent No. 7,570,686 (the "'686 patent"), claims 17, 36, and 37:**  Claims 17 and 36 of the '686 patent are not essential to the implementation of VDSL2 for at least the following

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reasons:

- VDSL2 does not require an "information storage media comprising instructions that when executed communicate diagnostic information over a communication channel using multicarrier modulation."  Nothing in VDSL2 requires a diagnostic system, nor does VDSL2 describe one.

- VDSL2 does not require "wherein one variable comprises an array representing frequency domain received idle channel noise information."  VDSL2 does not specify or otherwise identify "frequency domain received idle channel noise information."  Nothing in VDSL2 or the '686 patent equates the "frequency domain received idle channel noise information" of the '686 patent to the "quiet line noise" described by the standard.  The standard states that quiet line noise occurs "when no VDSL2 signals are present on the loop."  *See* VDSL2 § 11.4.1.1.2.  The '686 patent does not define "frequency domain received idle channel noise information" as present when no VDSL2 signals are present on the loop.

Claim 37 of the '686 patent is not essential to the implementation of VDSL2 for at least the following reasons:

- Claim 37 depends from claim 36 of the '686 patent, and for at least the same reasons as stated above with respect to claim 36, claim 37 of the '686 patent is not essential to VDSL2.

**Family 2:**

**U.S. Patent No. 7,453,881 ("'881 patent"), claims 17, 18, and 23:**  Claim 17 of the '881 patent is not essential to the implementation of VDSL2 and ITU-T G.998.2, including IEEE Std. 802.3ah-2004 as referenced by Ethernet Bonding standards, or to the implementation of

ADSL2/2+ and Ethernet Bonding, for at least the following reasons:

- ADSL2/2+ and VDSL2 by their own terms are limited to supplying data over a single copper pair. *See, e.g.*, G.992.3, p. 1, "Scope"; G.993.2 § 5.4.  Thus "bonding" is not essential to ADSL2/2+ or VDSL2.  Any accused product capable of communication via multiple twisted pair lines is also capable of communication via a single pair; it is the network operator's choice to connect a single line or multiple lines.

- Ethernet Bonding, ADSL2/2+, and VDSL2 do not require that "each bonded transceiver utiliz[e] at least one transmission parameter value to reduce a difference in latency between the bonded transceivers."  While Section 61.2.2.5 of IEEE 802.3ah-2004 indicates that large differential latencies require large sequence number ranges and can be controlled by "configuring the bit rate, error correction and interleaving functions in the PMA/PMD of each link," there is no mandate to "reduce a difference in latency between the bonded transceivers."  Section 61.2.2.5 requires only that "the differential latency between any two PMEs in an aggregated group shall be no more than maxDifferentialDelay."  If links that are to be aggregated train up with a differential latency that is within the maxDifferentialDelay, they may be aggregated without any further reduction in differential latency and without using any "transmission parameter value" to reduce differential latency.

- Ethernet Bonding, ADSL2/2+, and VDSL2 do not require that "each bonded transceiver utiliz[e] at least one transmission parameter value to reduce a difference in latency between the bonded transceivers." Even if one chose to reduce a differential latency between bonded links by using at least one of the bit rate, error correction and interleaving functions, one link could be chosen as a reference, and the bit rate, error

correction and interleaving functions other links could be optimized to reduce the differential latency with respect to the reference link. Therefore, the transceiver associated with the reference link would do nothing; it would not "utiliz[e] at least one transmission parameter value to reduce a difference in latency between the bonded transceivers" or aggregated links.

Claims 18 and 23 of the '881 patent are not essential to the implementation of Ethernet Bonding, ADSL2/2+, or VDSL2 for at least the following reasons:

- Claims 18 and 23 depend from claim 17 of the '881 patent, and are not essential to Ethernet Bonding, ADSL2/2+ or VDSL2 for at least the same reasons as stated above in connection with claim 17.

**Family 3**

**U.S. Patent No. 7,844,882 (the "'882 patent"), claims 13, 14, and 15:**  Claim 13 of the '882 patent is not essential to the implementation of VDSL2 for at least the following reasons:

- TQ Delta has acknowledged that "[t]he VDSL2 standard requires the message exchange recited in these claims, though it does not expressly disclose how to share memory to enable that exchange."

- VDSL2 does not require a system that "allocates shared memory."  According to VDSL2, "[t]he required aggregate interleaver and de-interleaver delay is specified in terms of the sum of the end-to-end delays in the upstream and downstream directions over both latency paths, expressed in octets."  VDSL2 § 6.2.8.  This provision does not require or indicate that VDSL2 requires the allocation of shared memory in a transceiver.

- VDSL2 does not require "a transceiver that performs: transmitting or receiving a

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message during initialization specifying a maximum number of bytes of memory that are available to be allocated to a deinterleaver." TQ Delta asserts that this claim element is met by the "O-PMS" message, which includes, among other fields, a "max_delay_octetDS,0." *See* VDSL2, § 12.3.2.5.2.1.3. However, the "max_delay_octetDS,0" field does not specify a maximum number of bytes of shared memory that are available to be allocated to a deinterleaver. Instead, the "max_delay_octetDS,0" specifies the maximum value of the end-to-end delay in octets for the interleaver and deinterleaver pair on downstream path 0. *See* VDSL2 § 6.2.8.

- VDSL2 does not require "wherein the allocated memory for the deinterleaver does not exceed the maximum number of bytes specified in the message." TQ Delta cites to "max_delay_octetDS,0" within the O-PMS message to allegedly meet this limitation. *See* VDSL2 § 12.3.5.2.1.3. As explained above, however, "max_delay_octetDS,0" does not specify a maximum number of bytes of memory that are allocated to a deinterleaver in shared memory in the transceiver.

Claims 14 and 15 of the '882 patent are not essential to the implementation of VDSL2 for at least the following reasons:

- Claims 14 and 15 depend from claim 13 of the '882 patent, and for at least the same reasons as stated above with respect to claim 13, claims 14 and 15 of the '882 patent are not essential to VDSL2.

**U.S. Patent No. 8,276,048 (the "'048 patent"), claims 1 5, 6, and 7:** Claims 1 and 5 of the '048 patent are not essential to the implementation of VDSL2 for at least the following reasons:

- TQ Delta has acknowledged that "[t]he VDSL2 standard requires the message exchange recited in these claims, though it does not expressly disclose how to share memory to enable that exchange."

- VDSL2 does not require a system that "allocates shared memory."  According to VDSL2, "[t]he required aggregate interleaver and de-interleaver delay is specified in terms of the sum of the end-to-end delays in the upstream and downstream directions over both latency paths, expressed in octets."  VDSL2 § 6.2.8.  This provision does not require or indicate that VDSL2 requires the allocation of shared memory in a transceiver.

- VDSL2 does not require "a transceiver that performs: transmitting or receiving a message during initialization specifying a maximum number of bytes of memory that are available to be allocated to a deinterleaver."  TQ Delta asserts that this claim element is met by the "O-PMS" message, which includes, among other fields, a "max_delay_octetDS,0."  *See* VDSL2, § 12.3.2.5.2.1.3.  However, the "max_delay_octetDS,0" field does not specify a maximum number of bytes of shared memory that are available to be allocated to a deinterleaver.  Instead, the "max_delay_octetDS,0" specifies the maximum value of the end-to-end delay in octets for the interleaver and deinterleaver pair on downstream path 0.  *See* VDSL2 § 6.2.8.

- VDSL2 does not require "wherein the allocated memory for the deinterleaver does not exceed the maximum number of bytes specified in the message."  TQ Delta cites to "max_delay_octetDS,0" within the O-PMS message to allegedly meet this limitation.  *See* VDSL2 § 12.3.5.2.1.3.  As explained above, however,

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"max_delay_octetDS,0" does not specify a maximum number of bytes of memory that are allocated to a deinterleaver in shared memory in the transceiver.

Claims 6 and 7 of the '048 patent are not essential to the implementation of VDSL2 for at least the following reasons:

- Claims 6 and 7 depend from claim 5 of the '048 patent, and for at least the same reasons as stated above with respect to claim 5, claims 6 and 7 of the '048 patent are not essential to VDSL2.

**Family 4**

**U.S. Patent No. 8,090,008 (the "'008 patent"), claim 14:**  Claim 14 of the '008 patent is not essential to the implementation of VDSL2 for at least the following reasons:

- VDSL2 does not require "a plurality of carrier signals for modulating a bit stream." The '008 patent's specification teaches that the claimed transceiver operates on the input bit stream to generate a set of N carrier signals, all of which are included in the transmission signal. *See, e.g.*, '008 patent at 5:14–17, 4:29–35.  Here, the '008 patent uses the term "plurality" to indicate all available carrier signals.  VDSL2 does not require the modulation of all available carrier signals.

- VDSL2 does not require that "each carrier signal has a phase characteristic associated with the bit stream."  During the initialization phases described by VDSL2, at least some subcarriers (carrier signals) as determined by their indices, will carry a constellation point of 00, which does not carry any input bits of the Special Operations Channel message on which TQ Delta reads this element.  *See, e.g.*, VDSL2, Table 12-37 ("00" carried by subcarriers with even indices and indices ending in 9); Table 12-38 (same); Table 12-46 (same); Table 12-69 (same); Table 12-

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68 ("00" carried by subcarriers with indices ending in 5).  Those subcarriers carrying

a constellation point of 00 do not have a phase characteristic associated with the input

bit stream.

- VDSL2 does not require "computing a phase shift for each carrier signal based on the

  value associated with that carrier signal." VDSL2 describes using a quadrant

  scrambler that modifies, or does not modify, the constellation point carried by a

  subcarrier based on the two bits generated by a PRBS generator.  *See, e.g.*, VDSL2

  § 12.3.6.2, Table 12-70.  Whether to modify or not to modify the constellation point

  on the subcarrier depends on the bits output by the PRBS generator (i.e., no

  modification if the bits are (0,0), change the point (X,Y) to the point (-Y,X) if the bits

  are (0,1), etc.) as described in Table 12-70.  No phase shift is ever computed; indeed,

  Table 12-70 itself provides the rotation angle corresponding to each possible two-bit

  output from the PRBS generator, thus obviating any need for a transceiver to compute

  a rotation angle.  Furthermore, Table 12-70 describes how the constellation point on a

  subcarrier should be modified (i.e., by changing the sign(s) and/or ordering of its X

  and Y components) to implement the indicated rotation angle.  The quadrant

  scrambler in VDSL2 does not "compute" a phase shift for a carrier signal; it uses a

  fixed table that specifies, for all possible two-bit outputs from the PRBS generator,

  whether and how to modify the constellation point carried by a subcarrier.  In

  addition, when the PRBS generator outputs a value of (0,0), the constellation point is

  left unmodified, and thus there is no "phase shift" for that carrier signal.

- VDSL2 does not require "combining the phase shift computed for each respective

  carrier signal with the phase characteristic of that carrier signal."  VDSL2 uses a

quadrant scrambler that modifies, or does not modify, the constellation point carried by a subcarrier based on the two bits generated by a PRBS generator. *See, e.g.*, VDSL2 § 12.3.6.2, Table 12-70. VDSL2 specifies a table that indicates how the constellation point carried by a subcarrier should be modified based on the output of the PRBS generator. No phase shift is ever computed, and therefore no computed phase shift is "combined" with the phase characteristic of the carrier signal. Instead, one or both signs and/or the ordering of the components of the constellation point are modified, or not modified, based on the bits output by the PRBS generator. By contrast, the '008 patent teaches adding or multiplying a calculated phase shift with a phase characteristic of a carrier signal to adjust the phase characteristic. *See, e.g.*, '008 patent at 6:57–8:22.

- VDSL2 does not require "multiple carrier signals corresponding to the scrambled carrier signals are used by the first multicarrier transceiver to modulate the same bit value." The claim language is unclear as to whether "the same bit value" means that all of the bits of the received bit stream are the same, or whether the bit value modulated is the same as the bit value that was originally modulated, or both.

**Family 6**

**U.S. Patent No. 8,462,835 (the "'835 patent"), claims 8, 10, and 26:** Claim 8 of the '835 patent is not essential to the implementation of VDSL2 for at least the following reasons:

- TQ Delta's infringement contentions are based on section 9.4.1 of VDSL2. The standard itself states that the control command for initiating the procedure is not defined in the standard, thus VDSL2 does not describe how to perform the allegedly claimed steps.

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- VDSL2 does not require a "transceiver, including a processor" (i.e., a transceiver with an integrated processor).  For example, VDSL2 can be implemented with a transceiver coupled to a separate processor.

- VDSL2 does not require "a transceiver . . . configurable to: . . . transmit a flag signal, and switch to using for transmission, a second FIP setting following transmission of the flag signal."  TQ Delta contends that the "Syncflag" defined in G.993.2 is the claimed "flag signal," but sending such a flag is not required by the Recommendation.  A product can comply with VDSL2 without sending or receiving a flag signal.  Nor does VDSL2 itself require sending or receiving a second FIP setting following transmission of the flag signal.

Claim 10  of the '835 patent is not essential to the implementation of VDSL2 for at least the following reasons:

- Claim 10 depends from claim 8 of the '835 patent, and for at least the same reasons as stated above with respect to claim 8, claim 10 of the '835 patent is not essential to VDSL2.

- VDSL2 does not require that the "first interleaver parameter value of the first FIP setting is different than a second interleaver parameter value of the second FIP setting."  VDSL2 does not require use of a second interleaver parameter value of a second FIP setting that is different than the first interleaver parameter value of the first FIP setting.

Claim 26  of the '835 patent is not essential to the implementation of VDSL2 for at least the following reasons:

- TQ Delta's infringement contentions are based on section 9.4.1 of VDSL2.  The

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standard itself states that the control command for initiating the procedure is not defined in the standard, thus VDSL2 does not describe how to perform the allegedly claimed steps.

- VDSL2 does not require a "transceiver, including a processor" (i.e., a transceiver with an integrated processor), as required by claim 24, from which claim 26 depends. For example, VDSL2 can be implemented with a transceiver coupled to a separate processor.

- VDSL2 does not require "a transceiver . . . configurable to: . . . receive a flag signal, and switch to using for reception, a second FIP setting following transmission of the flag signal" as required by claim 24, from which claim 26 depends. TQ Delta contends that the "Syncflag" defined in G.993.2 is the claimed "flag signal," but sending such a flag is not required by the Recommendation. A product can comply with VDSL2 without sending or receiving a flag signal. Nor does VDSL2 itself require sending or receiving a second FIP setting following transmission of the flag signal.

- VDSL2 does not require that the "first interleaver parameter value of the first FIP setting is different than a second interleaver parameter value of the second FIP setting." VDSL2 does not require use of a second interleaver parameter value of a second FIP setting that is different than the first interleaver parameter value of the first FIP setting.

**U.S. Patent No. 10,567,112 (the "'112 patent"), claims 8 and 10:**  Claim 8 of the '112 patent is not essential to the implementation of G.9701 for at least the following reasons:

- G.9701 does not require a "receiver operable to switch, during the steady-state

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communication, to receiving using a second FIP setting that comprises a second FEC codeword size that is different than the first FEC codeword size and a second number of FEC coding parity bytes that is different than the first number of FEC coding parity bytes."

- In addition, G.9701 does not require "wherein the switching to receiving using the second FEC codeword size and the second number of FEC coding parity bytes is based on a counter reaching a value." The counter described in the '112 patent counts a number of transmitted or received FEC codewords, starting from 0, counting up, and rolling over after 1023. In contrast, G.9701 uses a "4-bit SRA superframe down count (SFDC)."

Claim 10 of the '112 patent is not essential to the implementation of G.9701 for at least the following reasons:

- Claim 10 depends from claim 8 of the '112 patent, and is not essential to G.9701 for at least the same reasons as stated above with respect to claim 8.

**Family 9**

**U.S. Patent No. 8,468,411 (the "'411 patent"), claims 10 and 18:** Claims 10 and 18 of the '411 patent are not essential to the implementation of G.998.4 and/or VDSL2 for at least the following reasons:

- Neither G.998.4 nor VDSL2 requires a memory to be allocated between a retransmission function and an interleaving and/or deinterleaving function.
- VDSL2 does not require retransmission.
- G.998.4 does not require retransmission in both transmission directions.
- Neither G.998.4 nor VDSL2 requires a message transmitted during initialization to

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indicate "how the memory has been allocated between the retransmission function and the interleaving and/or deinterleaving function."

**U.S. Patent No. 9,094,348 (the "'348 patent"), claims 1, 2, 9, and 10:**  Claims 1 and 9 of the '348 patent are not essential to the implementation of G.9701 for at least the following reasons:

- G.9701 does not require transceivers to transmit/receive packets "using" forward error correction encoding/decoding and interleaving/deinterleaving.  To the extent forward error correction encoding/decoding and interleaving/deinterleaving are required at all, they are required to be applied before transmission and after reception.

- G.9701 does not require transceivers to transmit or receive packets comprising "a header field and a plurality of PTM-TC codewords, a plurality of ATM cells or a plurality of Reed-Solomon codewords."  The DTU before the FEC is applied has a DTU header but does not include any PTM-TC codewords, ATM cells, or Reed-Solomon codewords, and the DTU after the FEC is applied comprises only Reed-Solomon codewords applied to scrambled bits.

- G.9701 does not require transceivers to "[transmit/receive] a plurality of messages using a forward error correction [encoder/decoder] . . . , wherein each message of the plurality of messages is [transmitted/received] in a different DMT symbol."  To the extent G.9701 requires forward error correction encoding/decoding, its application would occur before "each message of the plurality of messages is [transmitted/received]."

- G.9701 does not require transceivers to transmit or receive a message that "includes an acknowledgment (ACK) or a negative acknowledgment (NACK) of the received

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packet."  The retransmission ACK bit-map of G.9701 does not acknowledge, either positively or negatively, any "packet [that] comprises a header field and a plurality of PTM-TC codewords, a plurality of ATM cells or a plurality of Reed-Solomon codewords."  To the extent the received DTU is a packet, it consists only of Q FEC codewords.  *See* G.9701, § 8.2.

Claims 2 and 10 of the '348 patent are not essential to the implementation of G.9701 for at least the following reasons:

- Claims 2 and 10 depend, respectfully, from claims 1 and 9 of the '348 patent and are not essential to G.9701 for at least the same reasons as stated above with respect to claims 1 and 9.

- G.9701 does not require that the received messages have a higher immunity to noise than the transmitted packet (claim 2), or that the transmitted messages have a higher immunity to noise than the received packet (claim 10).

**U.S. Patent No. 9,485,055 (the "'055 patent"), claims 11 and 17:**  Claims 11 and 17 of the '055 patent are not essential to the implementation of G.9701 at least because G.9701 does not require the transceiver to store the first type of packet in a retransmission buffer after transmission.  Claim 17 is not essential to the implementation of G.9701 for at least the additional reason that G.9701 does not specify packets comprising "one or more PTM-TC (Packet Transfer Mode-Transmission Convergence) codewords."

**U.S. Patent No. 10,833,809 (the "'809 patent"), claims 8, 11, and 13:**  Claim 8 of the '809 patent is not essential to the implementation of G.9701 for at least the following reasons:

- G.9701 does not require transceivers to receive packets "using" forward error correction decoding and deinterleaving.  To the extent forward error correction

decoding and deinterleaving are required at all, they are required after reception.

- G.9701 does not require transceivers to "transmit a message using forward error correction encoding."  To the extent G.9701 requires forward error correction in the transmitter, its application occurs before the message is transmitted.

- G.9701 does not require a transceiver to receive a packet that "comprises a header field and a plurality of Reed-Solomon codewords."  G.9701 does not require reception of a packet that comprises both a header field and a plurality of Reed-Solomon codewords.  The DTU before the FEC is applied has a DTU header but does not include any Reed-Solomon codewords, and the DTU after the FEC is applied comprises only Reed-Solomon codewords.

- G.9701 does not require transceivers to transmit a message that "includes an acknowledgment (ACK) or a negative acknowledgment (NACK) of the received packet."  The retransmission ACK bit-map of G.9701 does not acknowledge, either positively or negatively, any "packet [that] comprises a header field and a plurality of Reed-Solomon codewords."  To the extent the received DTU is a packet, it consists only of Q FEC codewords.

Claim 11 of the '809 patent is not essential to the implementation of G.9701 for at least the following reasons:

- Claim 11 depends from claim 8 of the '809 patent and is not essential to G.9701 for at least the same reasons as stated above with respect to claim 8.

Claim 13 of the '809 patent depends from claim 9, which depends from claim 8. Claim 13 is not essential to the implementation of G.9701 for at least the following reasons:

- Claim 13 depends indirectly from claim 8 of the '809 patent and is not essential to

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G.9701 for at least the same reasons as stated above with respect to claim 8.

- G.9701 does not require that the transmitted message to have a higher immunity to noise than the received packet as required by claim 9.

Claim 8 of the '809 patent is not essential to the implementation of G.998.4 for at least the following reasons:

- G.998.4 does not require any transceiver to be capable of receiving packets "using" forward error correction decoding and deinterleaving.  To the extent forward error correction decoding and interleaving are applied at all, they are applied after reception.

- G.998.4 does not require a transceiver to be capable of receiving a packet that "comprises a header field and a plurality of Reed-Solomon codewords."  G.998.4 does not require a packet that comprises both a header field and a plurality of Reed-Solomon codewords.  The DTU before the FEC is applied does not include any Reed-Solomon codewords, even if the SID is a header field, and the DTU after the FEC is applied includes only Reed-Solomon codewords but no header field.

- G.998.4 does not require a transceiver to be capable of transmitting a message that "includes an acknowledgment (ACK) or a negative acknowledgment (NACK) of the received packet."  G.998.4's Nack[k] field does not acknowledge, either positively or negatively, any "packet [that] comprises a header field and a plurality of Reed-Solomon codewords."  To the extent the received DTU is a packet, it consists only of Q RS codewords.  *See* G.998.4, Figure 8-1

Claim 11 of the '809 patent is not essential to the implementation of G.998.4 for at least the following reasons:

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- Claim 11 depends from claim 8 of the '809 patent and is not essential to G.998.4 for at least the same reasons as stated above with respect to claim 8.

Claim 13 of the '809 patent depends from claim 9, which depends from claim 8. Claim 13 is not essential to the implementation of G.998.4 for at least the following reasons:

- Claim 13 depends indirectly from claim 8 of the '809 patent and is not essential to G.998.4 for at least the same reasons as stated above with respect to claim 8.

- G.998.4 does not require that the transmitted message to have a higher immunity to noise than the received packet as required by claim 9.

**Family 10**

**U.S. Patent No. 8,937,988 (the "'988 patent"), claim 16:**  Claim 16 of the '988 patent is not essential to the implementation of G.9701 for at least the following reasons:

- G.9701 does not require a multicarrier transceiver that is "operable to demodulate for reception a [first/second/third] plurality of bits using a [first/second/third]" SNR margin.

**U.S. Patent No. 9,154,354 (the "'354 patent"), claim 10:**  Claim 10 of the '354 patent is not essential to the implementation of G.9701 for at least the following reasons:

- G.9701 does not require a transceiver to receive bits "using" any SNR margin.

- G.9701 does not require a transceiver to "receive a multicarrier symbol comprising a first plurality of carriers and a second plurality of carriers" and also "receive a [first/second] plurality of bits on the [first/second] plurality of carriers using a [first/second] SNR margin."

Pursuant to Federal Rule of Civil Procedure 26(e)(1), CommScope reserves the right to revise or supplement this response as necessary.

## SECOND SUPPLEMENTAL RESPONSE TO INTERROGATORY NO. 5:

CommScope restates each of the General Objections and specific objections as if set forth fully herein.  CommScope has not completed its investigation in this case and has not completed discovery.  CommScope bases this response on Plaintiff's Disclosure of Asserted Claims and Infringement Contentions, dated November 4, 2021, including as later corrected by TQ Delta, *see* Dkt. Nos. 98, 105, and the combinations of patent claims and standards charted therein.  This response is based only upon such information in CommScope's possession, custody or control, and CommScope's current understanding of TQ Delta's infringement contentions and interpretation of the relevant standards.  Should TQ Delta further modify its infringement contentions, CommScope reserves the right to supplement or modify this response accordingly. Further discovery (including expert discovery) and investigation may reveal additional information that may lead to additions or to variations on the contentions set forth herein, and CommScope reserves the right to modify or supplement this response accordingly. CommScope provides this response only as to those portions of the standards on which TQ Delta relies for each of its infringement contentions for the asserted claims. This response is not intended to be specific to any implementation of any of the relevant standards including, but not to, any CommScope product.

CommScope interprets the term "essential to the implementation" consistent with the manner in which it is used by the International Telecommunications Union Telecommunications Standardization Sector ("ITU-T"), that "[e]ssential patents are patents that would be required to implement a specific Recommendation/Deliverable." *See* Patent and Licensing Statement and Licensing Declaration for ITU-T or ITU-R Recommendation/ISO or IEC Deliverable.

Should one or more of the asserted claims be found to be essential to the implementation

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of one or more of the standards and recommendations identified by TQ Delta, CommScope

reserves, and explicitly does not waive, the right to demand that TQ Delta comply with its

obligation to license such a claim under fair, reasonable, and non-discriminatory terms.

Subject to, and without waiving, its Specific and General Objections, and based on

CommScope's current understanding of the information sought by this Interrogatory and

CommScope's current understanding of the facts of this case, CommScope responds as follows:

Pursuant to Federal Rule of Civil Procedure 33(d), CommScope identifies the following

documents: TQ Delta's Supplemental Response to CommScope's Interrogatory No. 5.

Pursuant to Federal Rule of Civil Procedure 26(e)(1), CommScope reserves the right to

revise or supplement this response as necessary.

**INTERROGATORY NO. 6:**

Describe in detail the steps taken, by any person or entity, to determine if any of the

Accused Products is compliant with, or at least compatible with, operation in accordance with

any part or subparts of the DSL Standards and include in your response an identification of the

documents and things relating to, referring to, and/or involving the same and an identification of

the person(s) employed by CommScope (other than legal counsel) most knowledgeable

regarding the same.

**AMENDED RESPONSE TO INTERROGATORY NO. 6:**

CommScope restates each of the General Objections as set forth fully herein.

CommScope objects to this Interrogatory on the grounds that it is compound and improperly

includes multiple subparts.  CommScope objects to this Interrogatory on the grounds that it seeks

disclosure of information subject to the attorney-client privilege and attorney work product

doctrine.  CommScope objects to this Interrogatory on the grounds that the phrase "the steps

Interrogatory as vague and ambiguous in its use of the terms "minimum skills," "qualifications,"
"and criteria."

Subject to, and without waiving, its Specific and General Objections, and based on
CommScope's current understanding of the information sought by this Interrogatory and
CommScope's current understanding of the facts of this case, CommScope responds as follows:

A person of ordinary skill in the art at the time of the alleged inventions described in the
Asserted Patents would have possessed a bachelor's degree in electrical or computer
engineering, or the equivalent, and at least 5–6 years of experience; a master's degree in
electrical or computer engineering, or the equivalent, and at least 2–3 years of experience; or a
Ph.D in electrical or computer engineering, or the equivalent, with at least 1–2 years of
experience.

Pursuant to Federal Rule of Civil Procedure 26(e)(1), CommScope reserves the right to
revise or supplement this response as necessary.

Dated this 14th day of November, 2022                Respectfully submitted,

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## CERTIFICATE OF SERVICE

The undersigned certifies that on this 14th day of November, 2022, all counsel of record

are being served with a copy of this document via electronic mail.


/s/ Eric H. Findlay
Eric H. Findlay